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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/831,416	05/09/2001	John Canning	CU-2504 RJS	4223
26530	7590	04/09/2004	EXAMINER	
LADAS & PARRY 224 SOUTH MICHIGAN AVENUE, SUITE 1200 CHICAGO, IL 60604			VALENTIN, JUAN D	
			ART UNIT	PAPER NUMBER

2877

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/831,416	CANNING, JOHN	
	Examiner	Art Unit	
	Juan D Valentin II	2877	<i>aw</i>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 18-22 and 26-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-22 and 26-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claim 18, 20-22, 26, 34, 38, 40, & 45 rejected under 35 U.S.C. 102(e) as being anticipated by Tseng et al. (USPN '188, hereinafter Tseng).

#### **Claim 18**

Tseng discloses an optical waveguide structure comprising an optical waveguide having a bend and being formed of a photosensitive material and having a bend for coupling the light signal around the bend (Fig. 1a, abstract). Tseng discloses a grating structure arranged to guide light of a predetermined wavelength around the bend in the waveguide (Fig. 1a, 30) thereby to reduce bending losses at the bend. Tseng discloses a grating structure comprising UV-induced refractive index variations in the waveguide (abstract). Tseng meets all the structural limitations of claim 18, in doing so it is inherent that the functional limitations of the claim will fall into place once the structural limitations are met.

#### **Claims 20 & 40**

Tseng further discloses an optical waveguide structure wherein the grating structure comprises a sampled grating (abstract). Applicant will be appreciated that even though Tseng

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does not specifically disclose a sampled grating, Tseng does disclose a tunable reflector/filter. It is inherent and well known to someone of ordinary skill in the art that a tunable reflector/filter comprises a sampled grating, therefore the reference of Tseng reads upon the Applicants claimed limitation.

#### **Claims 21 & 22**

Tseng discloses an optical waveguide structure wherein the grating structure is disposed to guide the light in a transmission mode or reflection mode (abstract).

#### **Claim 26**

It is the position of the Office that when the refractive index of the grating is not being tuned, it includes regions of constant reflective index which extend in a propagation direction of the waveguide, therefore reading on Applicants claimed limitations.

#### **Claim 34**

Tseng discloses a method of reducing bending losses in a photosensitive waveguide having a bend for coupling a light signal propagating in the waveguide around the bend (Fig. 1a, abstract). Tseng discloses using **UV light to induce** refractive index variations in the waveguide such that at least one grating structure is formed, wherein the grating structure is disposed to guide the light around the bend (abstract). Tseng meets all the structural limitations of claim 18, in doing so it is inherent that the functional limitations of the claim will fall into place once the structural limitations are met.

#### **Claim 38**

Tseng discloses a optical waveguide having a bend and being formed of a photosensitive material (Fig. 1a, abstract). Tseng further discloses a grating (Fig. 1a, 30) structure arranged to

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guide light of a predetermined wavelength in a transmission mode around the bend in the waveguide, the grating structure comprising **UV-induced** refractive index variations in the waveguide (abstract).

**Claim 45**

Tseng discloses a method of adapting a photosensitive waveguide to guide light of a predetermined wavelength around a bend in the waveguide (Fig. 1a, 10, abstract). Tseng discloses using **UV light to induce** refractive index variations in the waveguide such that at least one grating structure is formed, wherein the grating structure is disposed to guide light in a transmission mode around the bend (abstract).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 19, 24, 35, 36, 39, 46, and 47 rejected under 35 U.S.C. 103(a) as being unpatentable over Tseng.

**Claims 19, 24, 36, 39, & 47**

Tseng discloses the claimed invention except it fails to show the wherein the grating structure comprises a continuous or chirped grating structure. It would have been obvious to someone of ordinary skill in the art at the time of the claimed invention to combine Tseng with either a continuous or chirped grating structure since it was well known to someone of ordinary

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skill in the art at the time of the claimed invention that Bragg Fiber Grating (BFG) structures can be designed to operate in several different manners depending on the desired outcome and Tseng teaches the use of a BFG (col. 1, line 50).

**Claims 35 & 46**

Tseng discloses the claimed invention except it fails to show wherein the grating structure creates an angular dispersion in the light propagated around the bend. It is inherent that the claimed invention creates an angular dispersion in the light propagated around the bend since it was well known in the art that gratings create dispersion, and gratings around a bend ultimately will create angular dispersion in light signals propagating those bends.

3. Claim 27-30, 33, 41, and 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Tseng in view of Facq. Et al. (USPN '437, hereinafter Facq).

**Claim 27**

Tseng substantially teaches the claimed invention except that it fails to show an optical waveguide structure wherein the regions extend parallel to the propagation direction. Facq shows that it is known to provide an optical waveguide structure wherein the regions extend parallel to the propagation direction (col. 3 and 4, lines 67-68 and 1-2) for an optical fiber Bragg grating system. It would have been obvious to someone of ordinary skill in the art to combine the device of Tseng with the optical waveguide structure wherein the regions extend parallel to the propagation direction of Facq for the purposes of providing efficient coupling of light signals from one optical fiber to another.

**Claim 28**

Tseng substantially teaches the claimed invention except that it fails to show an optical waveguide structure wherein the regions extend cylindrically parallel to the propagation direction. Facq shows that it is known to provide an optical waveguide structure wherein the regions extend cylindrically parallel to the propagation direction (col. 5, lines 35-48, Fig. 6A and 6B) for an optical fiber Bragg grating system. It would have been obvious to someone of ordinary skill in the art to combine the device of Tseng with the optical waveguide structure wherein the regions extend cylindrically parallel to the propagation direction of Facq for the purposes of providing efficient coupling of light signals from one optical fiber to another.

**Claim 29**

Tseng in view of Facq in conjunction with claim 28 rejection above, discloses the claimed invention except it fails to show an optical waveguide structure wherein the regions extend ellipsoidally parallel to the propagation direction. It would have been an obvious matter of design choice to someone of ordinary skill in the art to combine Tseng in view of Facq with an optical waveguide structure wherein the regions extend ellipsoidally parallel to the propagation direction. The applicant has not disclosed that an ellipsoidal grating region parallel to the propagation direction solves any stated problem or is for any particular purpose, it is a matter of design choice to choose the length of grating regions in radial directions and it is the position of the Office that the circular region disclosed by Tseng in view of Facq reads upon the applicants claimed limitation.

**Claims 30 & 41**

Tseng substantially teaches the claimed invention except that it fails to show an optical waveguide structure wherein the device further comprises at least one optical reflector disposed in a direction transverse to a propagation direction of the waveguide to aid in guiding the light around the bend. Facq shows that it is known to provide an optical reflector disposed in a direction transverse to a propagation direction of the waveguide (Fig. 4, col. 4 and 5, lines 64-68 and 1-12, resp.) for an optical fiber Bragg grating system. It would have been obvious to someone of ordinary skill in the art to combine the device of Tseng with the optical reflector disposed in a direction transverse to a propagation direction of the waveguide of Facq for the purposes of providing efficient propagation of light signals through a bend waveguide.

**Claims 33 & 44**

Tseng substantially teaches the claimed invention except that it fails to show an optical waveguide structure as a sensor further comprising means for measuring an intensity of the light at a predetermined point along the waveguide for determining changes in intensity due to induced changes in confinement conditions of the sensor. Facq shows that it is known to provide an optical waveguide structure as a sensor further comprising means for measuring an intensity of the light for an optical fiber Bragg grating system (col. 5, 6, and 7, lines 35-68, 1-68, and 1-13, resp.). It would have been obvious to someone of ordinary skill in the art to combine the device of Tseng with the optical waveguide structure as a sensor of Facq for the purposes of providing efficient propagation of light signals through a bend waveguide.

It is obvious and well known to someone of ordinary skill in the art that the measured flux of Facq is equivalent to the claimed measured light intensity of Applicant. Facq shows



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different sensors for different changes in confinement conditions as well. Therefore, Applicant will be appreciated that the reference of Tseng in view of Facq reads upon the claimed limitations.

4. Claim 31 & 42 rejected under 35 U.S.C. 103(a) as being unpatentable over Tseng in view of Yoshimura et al. (USPN '632, hereinafter Yoshimura).

**Claims 31 & 42**

Tseng substantially teaches the claimed invention except that it fails to show an optical waveguide structure wherein the device comprises two or more grating structures angularly disposed with respect to each other to guide the light around a plurality of bends in the waveguide. Yoshimura shows wherein the device comprises two or more grating structures angularly disposed with respect to each other to guide the light around a plurality of bends in the waveguide (Fig. 45, col. 17, lines 4-43) for an optical waveguide system. It would have been obvious to someone of ordinary skill in the art to combine the device of Tseng with the optical waveguide device of Yoshimura for the purposes of providing efficient propagation of light signals through a bend waveguide.

5. Claims 32, 37, 43, & 48 rejected under 35 U.S.C. 103(a) as being unpatentable over Tseng in view of Fokine et al. (USPN '018 B1).

**Claims 32, 37, 43, & 48**

Tseng substantially teaches the claimed invention except that it fails to show wherein each grating structure is formed by UV-holography. Fokine shows that is known to provide

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grating structures produced by UV-holography (col. 8, lines 26-36) for an optical means with a periodically varying refractive index. It would have been obvious to someone of ordinary skill in the art to combine the device of Tseng with the grating writing method of Fokine for the purposes of providing efficient propagation of light signals through a waveguide.

### ***Response to Arguments***

6. Applicant's arguments filed 12/11/2003 have been fully considered but they are not persuasive.

7. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Tseng teaches the use of a fiber grating disposed along an arcuate recess (bend), Tseng is silent with regard to the orientation of regions of refractive index within the Bragg grating, but it is obvious and well known to someone of ordinary skill in the art at the time of the claimed invention to use Bragg gratings that exhibit variations of refractive index which are disposed in plane, parallel or periodic with respect to the propagation direction depending on the particular coupling functions the grating is to perform as taught by Facq (see rejection of claims 27-29 above).

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8. In response to applicant's argument that Tseng's grating structure is not arranged to guide light around a bend, for further clarification of the record, it can be seen clearly as shown above with regard to rejected claims 18, 34, 38, & 35, that Fig. 1(a) shows a grating fiber 10 located at the peak of the arcuate recess (bend) of substrate 40 (col. 2, lines 46-54) in order to "guide light of a predetermined wavelength around the bend". The Bragg grating of Tseng acts as a filter for reflecting most of the light as argued by applicant, but, it is clear within the reference that the Bragg grating ALSO allows "light of a predetermined wavelength" to be guided around the arcuate recess (bend). Further, applicant has not specifically claimed any particular structural features with regards to the claimed "bend" i.e. specific radius of curvature therefore the rejection is maintained.

### *Conclusion*

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

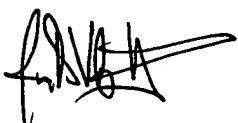
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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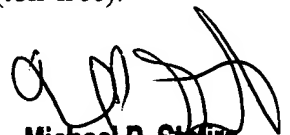
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan D Valentin II whose telephone number is (571) 272-2433. The examiner can normally be reached on M-Th., Every other Fr..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Juan D Valentin II  
Examiner 2877  
JDV  
April 6, 2004



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